

Examining the Impact of Anxiety Symptoms on Relations between Reactive and Proactive  
Aggression and the Quality and Stability of Children's Best Friendships

By

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### **Abstract**

The current study examined anxiety symptoms as a moderator of the relation between reactive and proactive aggression and the quality and stability of children's relationships with their best friend. An at-risk sample of 132 (55% male; 73% African American) 5 to 14-year-old children from low-income families was recruited from a community center that offered childcare to underserved populations. Data were collected at baseline and two months later, with the second wave of data collection yielding a sample of 79 children. Structural equation modeling was used to examine relations between baseline levels of reactive and proactive aggression and friendship quality and stability two months later. Additionally, anxiety symptoms measured at baseline were examined as a moderator of the relations between these functions of aggression and the quality and stability of children's best friendships. Contrary to hypotheses, no first order effects were found for either reactive or proactive aggression predicting friendship quality or stability. A first order effect was found in which child anxiety predicted a greater likelihood of friendship instability. However, levels of anxiety symptoms were not found to influence perceived level of friendship quality. Additionally, anxiety was not found to moderate the relations between reactive or proactive aggression and either friendship success variable. Post-hoc analyses failed to find differences for gender or age.

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## Examining the Impact of Anxiety Symptoms on Relations between Reactive and Proactive Aggression and the Quality and Stability of Children's Best Friendships

Social relationships play an integral role in children's psychosocial development. The ability to form positive peer relationships early in life has implications for adjustment and well-being throughout childhood, adolescence, and adulthood (Rubin, Bukowski, & Laursen, 2009). Children's friendships can be characterized in terms of both quality and stability, and these factors appear to be of particular importance when examining both positive and negative psychosocial outcomes (Poulin & Chan, 2010; Vitaro, Boivin, & Bukowski, 2009). Thus, a better understanding of the factors that contribute to individual differences in these definitive features of positive friendships is an important area of study. Aggression has been found to be a risk factor for the development of poor peer relationships (Coie, Dodge, & Kupersmidt, 1990). However, this relation is not always consistent (Coie, Dodge, Terry, & Wright, 1991), suggesting the need to examine different functions of aggressive behavior.

Aggression may be described as being either reactive or proactive, based on the functions or motivations behind the aggressive behavior. Reactive aggression is a defensive response to a perceived provocation, whereas proactive aggression is used as a means for achieving a desired goal (Vitaro, Brendgen, & Barker, 2006). Although these functions have been found to be related to different peer relationship outcomes (Card & Little, 2006), very little research has examined how reactive and proactive aggression are related to the quality and stability of children's best friendships. Furthermore, additional factors may play important roles in these associations. Internalizing symptomatology, specifically anxiety, has been found to be highly comorbid with aggression (Angold, Costello, & Erkanli, 1999) and can also be detrimental to various aspects of children's peer relationships (Kingery, Erdley, Marshall,

Whitaker, & Reuter, 2010). Therefore, the presence of anxiety symptoms may exacerbate the association between aggression and poor friendship quality and stability. Accordingly, the aim of the current study was to examine how reactive and proactive aggression are differentially associated with the quality and stability of children's friendships and whether anxiety functions as a moderator of these relations.

### **Friendships: Quality and Stability**

Friendships are dyadic interactions that involve a large degree of reciprocity, providing a context in which children can learn important social skills (e.g., perspective-taking and managing conflict) and develop positive self-perceptions (Asher, Parker, & Walker, 1998; Glick & Rose, 2011). In general, research backs the popular notion that friendships are largely beneficial to children's psychosocial adjustment (Rubin, Bukowski, & Parker, 2006). Most of the empirical literature has concentrated on children's relationships with their best friend, which may vary a great deal in terms of success. Quality and stability are two aspects that are important to consider when determining the success of children's relationships with their best friend.

Friendship quality refers to certain defining features of the dyadic relationship, such as levels of perceived support, companionship, and conflict (Ladd, Kochenderfer, & Coleman, 1996). Although there is a large amount of theoretical support for the conception that friendship quality impacts social skills development, there appears to be limited empirical investigation of this relation. However, in one such study, Glick and Rose (2011) presented children and adolescents with two vignettes of stressful social situations, one in which they could help a friend and one in which they were to seek help from a friend. Children with high quality best friendships were more likely to use emotionally engaging strategies (e.g., talking about the problem) in the help-giving vignette. High quality best friendships also predicted decreases in the

use of maladaptive, disengaged strategies (e.g., ignoring the problem) over the course of the school year. Additionally, high quality best friendships continued to predict the increased use of effective social strategies over the course of the school year, even after controlling for levels of overall peer acceptance.

In addition to helping children develop effective social skills, friendship quality may also impact children's overall adjustment. For instance, high quality friendships have been found to be related to better teacher-reported behavioral, emotional, and social adjustment in middle childhood, even when controlling for number of friends and level of peer acceptance (Waldrip, Malcolm, & Jensen-Campbell, 2008). Furthermore, high quality friendships have been found to be related to lower self-reported levels of loneliness in both elementary school children and adolescents (Liu & Wang, 2009; Woods, Done, & Kalsi, 2008). In contrast, poor friendship quality tends to be related to greater maladjustment, as measured by teacher-reported internalizing, externalizing and social problems (Waldrip, Malcolm, & Jensen-Campbell, 2008).

High quality best friendships may help children learn effective social strategies in addition to being a unique predictor of adjustment across various developmental periods. However, friendships are composed of multiple dimensions, and whether children's friendships can be characterized as stable or unstable may also have important implications for children's developmental outcomes.

Friendship stability refers to the maintenance of peer relationships, or the amount of time between relationship formation and termination (Berdnt & Hoyle, 1985). Children's friendships are static and tend to change over time, and as many as 50% of friendships in late childhood and early adolescence do not remain stable over the course of a school year (Bowker, 2004). However, a meta-analytic review revealed that most studies have not addressed this instability

and have examined friendships at a single time point, rather than across time (Newcomb & Bagwell, 1995).

From their recent review, Poulin and Chan (2010) concluded that many gaps exist in the literature on friendship stability as it relates to children's psychosocial outcomes. Although little work has examined how best friendship stability uniquely contributes to children's psychosocial development, Bowker (2004) found best friendship stability to be uniquely related to adolescents' conflict-resolution strategies. There is also some evidence indicating that individual differences do exist in the stability of children's friendships and that stable friendships are associated with higher levels of prosocial behavior, sociability, and popularity (Berndt, 1989; Berndt, Hawkins, & Jiao, 1999). Moreover, having a greater number of friendships that remain stable over the course of the year has been found to predict better academic adjustment and improvement in attitudes about school in kindergarten children (Ladd, 1990). Additionally, stable friendships are related to lower levels of internalizing (i.e., loneliness; Parker & Seal, 1996) and externalizing (i.e., bullying and victimization; Bowker, Rubin, Burgess, Booth-LaForce, & Rose-Krasnor, 2006) problem behaviors.

In sum, existing literature suggests that both friendship quality and stability are related to a number of important social, emotional, and behavioral outcomes in children and adolescents. However, few studies have examined what factors may impact these friendship variables. Both reactive aggression and anxiety have been linked to peer difficulties (Boivin, Dodge, & Coie, 1995; Ginsberg, La Greca, & Silverman, 1998), but how reactive aggression and anxiety affect these friendship success variables remains unclear. Thus, it is important to examine how individual differences in reactive aggression and anxiety influence children's ability to have high quality friendships and maintain the same friendships over time.



## **The Reactive and Proactive Aggression Distinction**

Rather than being defined by specific aggressive acts, reactive and proactive aggression are distinguished according to the motivation behind, or the intended function of, the aggressive behavior. Despite the fact that past studies have found significant intercorrelations between reactive and proactive aggression, ranging from .41 (Day, Bream, & Pal, 1992) to .82 (Poulin & Boivin, 2000), factor analytic methods support the proactive- reactive dichotomy (Fite, Colder & Pelham, 2006; Little, Jones, Henrich & Holly, 2003; Raine et al., 2006).

Reactive aggression occurs as a response to a perceived threat; it is emotionally driven and defensive. This function can be best explained by the frustration-aggression hypothesis, which describes aggression as a hostile and retaliatory response to perceived provocation or frustration (Berkowitz, 1978, 1989). The motivation behind reactive aggression is to protect oneself from whoever the individual perceives as instigating the threat (Vitaro, Brendgen & Barker, 2006). In contrast, proactive aggression refers to goal-oriented aggression that is motivated by external reward; it is instrumental, offensive, and requires no provocation or feelings of anger. Proactive aggression is best explained by the social learning theory (Bandura, 1973), which posits that aggression is a learned behavior contingent upon reinforcement for the perpetration of aggressive acts. This is to say that proactive aggression is motivated by the expectancy of a reward following an aggressive act.

To further support the distinction between reactive and proactive aggression, these functions of aggression tend to have unique etiologies and developmental outcomes (Fite, Colder, Lochman, & Wells, 2008; Vitaro & Brendgen, 2011; Vitaro, Brendgen, & Barker, 2006). Reactively aggressive behavior is often associated with internalizing symptomatology, such as depression, anxiety, and loneliness; in contrast, proactive aggression has been linked to

externalizing symptomatology and delinquency (Bubier & Drabick, 2009; Card & Little, 2006; Fite, Rathert, Colder, Lochman, & Wells, 2012; Fite, Stoppelbein, Gaertner, Greening, & Elledge, 2011; Fite, Stoppelbein, & Greening, 2009; Vitaro & Brendgen, 2011).

Children who are anxious or reactively aggressive tend to attribute hostile intent to others' actions, even when social cues are ambiguous. Due to this shared characteristic, it should be no surprise that a greater-than-chance co-occurrence of anxiety with reactive aggression has been found in both clinic and community samples (Angold, Costello, & Erkanli, 1999; Costello, Mustillo, Erkanli, Keeler, & Angold, 2003). However, the specific role that anxiety plays in the developmental progression of reactive aggression remains unclear.

Research demonstrates that comorbidity of externalizing and internalizing disorders has important implications for the developmental progression of externalizing problems, including treatment and prevention outcomes. Unfortunately, the direction of effects is not well understood (Cunningham & Ollendick, 2010; Drabick, Ollendick, & Bubier, 2009), and there is evidence to suggest that the presence of comorbid anxiety may bolster (i.e., protective hypothesis; Costin & Chambers, 2007) or hinder (Zoccolilo, 1992) the effectiveness of treatment for aggression.

High levels of externalizing symptoms in combination with high levels of anxiety may lead to an increased risk of antisocial behaviors (i.e., multiple problem hypothesis; Garai, Forehand, Colletti, & Rakow, 2009). In fact, it has been posited that the presence of anxiety exacerbates the hostile tendencies of children who are reactively aggressive, leading to greater impairment in functioning (Drabick, Ollendick, & Bubier, 2009). The presence of anxiety may increase the likelihood of engagement in high-risk behaviors through shared risk factors, such as alcohol use or associations with delinquent peers groups (Garai, Forehand, Colletti, & Rakow, 2009). Despite these associations, however, there is a paucity of literature examining the

implications of comorbid reactive aggression and anxiety on child outcomes (Bubier & Drabick, 2009), including their combined influence on the quality and stability of children's best friendships.

Reactively and proactively aggressive behaviors differentially contribute to children's abilities to have positive peer relationships. Reactively aggressive behavior is related to children being consistently less accepted and more rejected than children who display more proactively aggressive behavior and children who are nonaggressive (Boivin, Dodge, & Coie, 1995; Card & Little, 2006; Morrow, Hubbard, McAuliffe, Rubin, & Dearing, 2006). In contrast, children who display mostly proactively aggressive behavior are more likely to be rated as popular by their peers (Boivin, Dodge, & Coie, 1995; Card & Little, 2006). Nonetheless, how these different functions of aggression are capable of influencing friendship quality and stability remains uncertain. In fact, it appears that only one study to date has examined these associations, with best friendship quality as the primary focus.

Over the course of a school year, Poulin and Boivin (1999) examined how teacher ratings of proactive and reactive aggression were related to the quality of 10, 11, and 12 year-old boys' best friendships. Their findings demonstrate that reactive and proactive aggression are related to distinct patterns of friendships quality, even after controlling for friendship reciprocity and peer status. Overall, boys' reactively aggressive behaviors were related to a decreased likelihood of being nominated as a very best friend. Additionally, at the beginning of the school year, boys' reactive aggression was related to lower reported friendship quality and higher conflict. However, in children who were able to maintain the same best friend over the course of the school year, boys' reactively aggressive behaviors were related to a reported decrease in the conflict that characterized their friendship.

In contrast, at the beginning of the school year, proactively aggressive behaviors were related to higher levels of best friendship quality and satisfaction. However, when boys were able to maintain their friendships throughout the year, proactive aggression was related to an increase in reported conflict within the friendship. On the other hand, proactively aggressive behavior was not related to perceived support or satisfaction over the course of the year. The findings from this study suggest that, although proactive aggressive may help children form friendships more readily, reactive aggression may not be as detrimental to the quality of friendships that remain at the end of a school year. Unfortunately, Poulin and Boivin (1999) did not examine whether reactive and proactive aggression were differentially related to the stability of friendships. Thus, a primary aim of the current study was concerned with examining associations between reactive and proactive aggression and best friendship quality as well as stability.

### **Anxiety and Peer Difficulty**

Anxiety disorders are extremely prevalent among children and are arguably the most commonly diagnosed disorders in childhood, with research suggesting a point prevalence between 8 and 20% (Costello, Egger, & Angold, 2005; Lewis, Byrd, & Ollendick, 2011). Additionally, anxious children are more prone to experiencing other negative outcomes, including depression and substance use (Kendall, Flannery-Schroeder, Safford, & Webb, 2004). Further, there is evidence to suggest that anxious children are more likely to experience difficulties with peer relationships (Kingery et al., 2010; Strauss, Frame, & Forehand, 1987). For example, anxious children are more likely to be rated as rejected by their peers (Bell-Dolan, Foster, & Christopher, 1995; Inderbitzen, Walters, & Bukowski, 1997; La Greca, Dandes, Wick, Shaw, & Stone, 1988; La Greca & Stone, 1993), and children who display anxiety symptoms are

more likely to report having no friends or at least fewer friends than children who do not display these symptoms (Beidel, Turner, & Morris, 1999; Chansky & Kendall, 1997).

Anxious children may report having more negative peer interactions because they tend to lack necessary social skills (Ginsberg, La Greca, & Silverman, 1998). These social skill deficits may carry over into friendships as well. Therefore, in addition to impacting larger peer group relationships, high anxiety may also affect various aspects of children's more intimate dyadic interactions. Specifically, high levels of anxiety have been linked to children's perceptions of having fewer best friends, feeling less competent in their friendships, and having friendships that are characterized by lower levels of intimacy, support, and companionship (La Greca & Lopez, 1998). Additionally, research on shy and socially- withdrawn youth has shown that these children are more likely to report lower perceptions of friendship quality (Fordham & Stevenson-Hinde, 1999; Rubin, Wojslawowicz, Rose-Krasnor, Booth-LaForce, & Burgess, 2006). Moreover, Vernberg, Abwender, Ewell, and Beery (1992) found that, in addition to friendship quality predicting low levels of anxiety, high levels of anxiety also predicted low perceived friendship intimacy, an important component of friendship quality. Thus, this study presented evidence to suggest that anxiety symptoms may impact the quality of children's friendships.

In regard to friendship stability, although one study has found shy/withdrawn children to be just as likely to have stable best friendships as control children (Rubin, Wojslawowicz, Rose-Krasnor, Booth-Laforce, & Burgess, 2006), there appear to be no studies that have examined the stability of friendships in anxious children. It may be that anxious children are less likely to maintain friends in addition to experiencing lower levels of friendship quality.

Both reactive aggression and anxiety share certain risk factors, such as the tendency to attribute hostile intent to peers' actions. Additionally, reactive aggression and anxiety are both

related to poor friendship outcomes. High levels of anxiety have been found to increase the risk for unfavorable outcomes in youth who also display high levels of aggression (i.e., multiple problems hypothesis; Garai et al., 2009). Considering the substantial co-occurrence of reactive aggression and anxiety in youth, and the fact that this comorbidity may lead to accumulated risk for poor outcomes, it is important to investigate how reactive aggression and anxiety interact to influence the success of children's friendships.

### **Current Study**

In sum, the current study aimed to expand upon the current body of literature by examining the relations between reactive and proactive aggression and best friendship quality and stability. Furthermore, the study investigated anxiety as a moderator of the relations between these functions of aggression and friendship quality and stability.

Reactive aggression at baseline was expected to be more strongly negatively associated with friendship quality and less likely to be associated with having a stable best friend two months later when compared to proactive aggression. Anxiety scores at baseline were also expected to be negatively related to the quality and stability of best friendships two months later. Moreover, anxiety at baseline was expected to moderate the relation between reactive, but not proactive, aggression and friendship quality and stability two months later. Specifically, levels of best friendship quality were expected to be lowest when both reactive aggression and anxiety were high. Further, a decreased likelihood of friendship stability was anticipated when levels of both reactive aggression and anxiety were high.

## Method

### Participants

A sample of 132 children (73 male) was recruited from a Boys and Girls Club of the Tennessee Valley, which is a community-based center aimed at providing childcare services to an economically disadvantaged population. The age range for the sample was 5 to 14 years ( $M_{age} = 8.83$  years,  $SD = 2.43$ ), and the sample was ethnically diverse, with 86% of children described as being from a minority group (73% African American, 14% Caucasian, 1% Hispanic, and 12% other). The majority of children lived in a single-parent or foster-parent home. The sample was considered to be low-income, with families' averaging \$12,000 in annual income (Boys and Girls Clubs of the Tennessee Valley, "Fast Facts PDF," n.d.). Ninety-three percent of the children received a fee reduction for their attendance to the community center and 58% of families received a government subsidy as part of a program which offers child care subsidies to low-income and at-risk families (Tennessee Government Department of Human Services, "Child-care Certificate Program," n.d.). Due to exposure to a number of environmental and economic stressors, the sample was considered to be an "at-risk" population.

### Procedures

Written parental consent for data collection was obtained during the first week of the summer term at the community center. Child assent was acquired just prior to administration of questionnaires at baseline. Child reports were collected in a group format at baseline and two months later, with a research team member reading each question aloud. Children completed their questionnaires individually, although at least two research team members were available to assist children with any problems or questions. In order to maintain confidentiality and increase accuracy of reporting, no community center staff members were present during data collection.

sessions. Additionally, children were seated far enough apart that they were unable to see each other's responses during questionnaire administration. Child questionnaire administration lasted approximately 20 minutes at both waves of data collection. As compensation for their participation, each child received a \$5.00 voucher to spend at the community center's store.

The education director was chosen as the preferred reporter on child behavior due to his high level of involvement with the children across a variety of settings, including supervision of children during field trips, extracurricular activities, and bus transportation.

The center director, who had access to children's records, reported a variety of information, including length of membership, attendance, disciplinary record, academic record, and demographics.

Consent was obtained from the education director and center director prior to the first wave of data collection. Surveys were filled out using Medialab software and took less than 10 minutes to complete for each child. Both directors were free to decline answering questions about any one child and were allotted a two week time frame to complete surveys. After completion, both directors received compensation in the form of a \$250.00 gift card at both time points.

Although data collected from the education director and center director are available for the entire sample of 132 children, follow-up data were obtained from only 79 children (44 male). The low rate of follow-up was due to the fact that children did not consistently attend the community center, with attendance proving to be especially low during the second wave of data collection.



## Materials

*Demographics.* Information regarding children's gender, age, and race was collected from the program's center director. Gender was coded as a dichotomous variable (1 = male or 2 = female). The director was asked to choose from five different descriptors to indicate children's race (1= Caucasian, 2 = Hispanic, 3= African American, 4 = Asian/ Pacific Islander, or 5 = Other).

*Proactive/reactive aggression.* The program's education director reported on the levels of proactive and reactive aggression using the Proactive/ Reactive Aggression Questionnaire (Dodge & Coie, 1987). This questionnaire consists of 6 statements; 3 describing reactive aggression and 3 describing proactive aggression. An example of an item that assesses proactive aggression is, "This child uses physical force (or threatens the use of physical force) to dominate other kids." An example of an item that assesses for reactive aggression is "When this child has been teased or threatened, he/she gets angry easily and fights back." Items were rated on a 5-point Likert scale (from 1= never to 5 = almost always) in order to indicate how often each child demonstrated the described behavior (Dodge & Coie, 1987). The internal consistency of both subscales was found to be high ( $\alpha = .97$  for reactive aggression and  $\alpha = .95$  for proactive aggression).

*Anxiety symptomatology.* In order to assess for the presence of anxiety symptoms, children responded to the Internalizing Scale of the Youth Self Report (YSR; Achenbach & Rescorla, 2001). The YSR is a 113 item measure that is scored on a 3-point Likert scale (0 = not true, 1 = sometimes or somewhat true, 2 = very or often true) with questions that cover a variety of behavioral and emotional problems that children have had in the past 6 months. The YSR is currently normed for 11 to 18 year olds, however, there is evidence that younger children (ages

7-10) are able to report reliably on the scales (Ebesutani, Bernstein, Martinez, Chopita, & Weisz, 2011). The current study used a DSM- IV oriented scale that was developed in order to mirror DSM-IV criteria for generalized anxiety disorder, separation anxiety disorder, and specific phobias (Achenbach, Dumenci, & Rescorla, 2003). Confirmatory factor analyses have found the DSM-IV oriented scales to show reasonable goodness-of-fit indices ( $GFI = .90$ ), and the internal consistency of the Anxiety Problems Scale was found to be modest ( $\alpha = .62$ ; van Lang, Ferdinand, Oldehinkel, Ormel, & Verhulst, 2005). This Anxiety Problems Scale normally consists of 6 items (nervous, fearful, worries, dependent, fears, and fears school). However, due to the fact that a limited number of subscales were used in the current study, the item assessing children's dependence on adults was not administered, and was therefore not included in the calculation of the Anxiety Problems Scale for the current study. The five items used in the current study (nervous, fearful, worries, fears, and fears school) were averaged to form the scaled score for anxiety symptoms, which was found to have an internal consistency of  $\alpha = .75$ .

*Best friendship quality.* Children responded to a shortened 18-item version of Parker and Asher's (1993) Friendship Quality Questionnaire (FQQ), which is a measure assessing children's perceptions of different qualitative aspects of their best friend relationship. The original FQQ was composed of 40 items assessing six domains: validation and caring, conflict resolution, conflict and betrayal, help and guidance, companionship, and recreation and intimate exchange. In the original version, each subscale was evaluated using three to nine items. The shortened version used the three items for each subscale that had the highest factor loadings in Parker and Asher's (1993) original report (Glick & Rose, 2011; Rose, 2002).

Children rated how accurately each item described their relationship with their best friend using a 5-point Likert scale (1= Not at all true to 5 = Really true). In the current study, the internal consistency of the FQQ was good at baseline ( $\alpha = .83$ ) and follow-up ( $\alpha = .84$ ).

*Best friendship stability.* Child friendship stability was evaluated using one question at each time point: “Who is your best friend?” Child-reported best friends at baseline were compared to child-reported best friends two months later. For analysis, a dichotomous variable was developed to indicate whether children had a stable best friend. If a child reported the same best friend at both time points, the friendship was considered to be stable (Yes = 1). In contrast, if a child reported a different best friend at time two, the friendship was considered unstable (No = 0).

### **Data Analytic Strategy**

Proposed hypotheses were evaluated by estimating structural equation path models using Mplus 6.12 statistical software (Muthén & Muthén, 2010). The current study examined friendship quality as a continuous variable and friendship stability as a dichotomous variable; for this reason, maximum likelihood robust estimation (MLR) was employed because it is capable of accommodating both continuous and dichotomous outcomes. Additional advantages to MLR are its robustness to non-normality and non-independence of observations (Kline, 1995).

In order to accommodate missing data, analyses were first run as proposed using Full Information Maximum Likelihood Estimation (FIMLE). FIMLE is a model-based approach to account for missing data which does not exclude cases and uses all available data in the model to calculate parameter estimates (Kline, 1995). This method was preferred because FIMLE has been found to be less biased and more efficient than other common methods for accommodating missing data, such as pairwise and listwise deletion (Arbuckle, 1996). However, the parameter

estimates of the model were unreliable due to a non-positive definite first-order derivative product matrix, which was most likely a result of the specific pattern of missingness present in the model. Because the amount of error inherent in the model could not be determined, the model was not considered to be interpretable.

Multiple imputation (MI) was then employed in order to account for missing data and obtain stable parameter estimates. Missing data values were imputed using Amelia II: A Program for Missing Data, which uses the EMB algorithm, combining the traditional Expectation Maximization (EM) algorithm with a bootstrap approach (Honaker, King, & Blackwell, 2012). MI fills in missing values with a distribution of imputations reflecting the uncertainty surrounding the missing data. Each imputed data set is based on a resampling plan and mimics a random sample from the original population. In this way, MI creates unbiased parameter estimates (including standard errors) and recovers the population variance which is critical to making statistical inferences (McKnight, McKnight, Sidani, & Figueredo, 2007; Rubin, 1996). Given the small number of cases and the large amount of missing data between time points, attempts to impute at the item-level led to model nonconvergence. Accordingly, scale-level imputation was used, which considerably reduced the number of imputation model variables (Graham, 2009).

Consistent with current MI recommendations, twenty imputed data sets were created (Enders, 2010). This number has been shown to maximize both relative efficiency (the magnitude of the MI standard error relative to its theoretical minimum) and power (Enders, 2010; Graham, Olchowski, & Gilreath, 2007). In line with current recommendations, all variables used in the model were mean centered and all interaction terms were created prior to imputing datasets (Enders, 2010; Hippel, 2009; Honaker et al., 2010). All model variables,

correlated variables, transformations, and interaction terms were included in the imputation model. Analyses were conducted for each imputed dataset, with results “pooled” across analyses to yield a single best estimate for each model parameter.

Two iterative path models were estimated in the current study. An initial path model, in which friendship quality and stability were regressed on all independent variables, examined the first-order effects of aggression and anxiety on both friendship variables. Next, interaction terms (i.e., reactive aggression X anxiety, proactive aggression X anxiety) were added to the model in order to determine if the relations between reactive and proactive aggression and the two friendship variables were dependent upon levels of anxiety symptoms (see Figure 1).

Because reactive and proactive aggression were highly correlated, the path model examined the effects of these variables simultaneously. Additionally, age, gender, and race were included as covariates in the model, as these demographic variables have been found to be related to aggression and anxiety, as well as friendship quality and stability (Card & Little, 2006; Kingery et al., 2010; Parker & Asher, 1993; Rubin, Bukowski, & Parker, 2006). Race was dichotomized (1 = African American, 0 = Other) because the sample was comprised of 73% African-American children. However, race was not found to correlate with outcome variables or significantly contribute to the path models, and was therefore excluded from final analyses. Gender and age were maintained in the model because significant correlations were found with outcome variables in the imputed data. Friendship quality measured at baseline was also included in analyses in order to account for the stability of the construct.

### **Missing Data Analyses**

Due to the sporadic child attendance in the summer program, missing data analyses were conducted. At the beginning of the summer, there was 12.9% missingness on measures of child

anxiety and friendship quality. Missingness on the outcome variables was high, with 45.1% of children ( $N = 60$ ) failing to report on friendship stability, and 39.8% of children ( $N = 53$ ) missing values on friendship quality. Analyses were run to determine if children who participated in both data waves differed significantly from children who participated in data collection exclusively at baseline. T-tests were run for age, reactive and proactive aggression, and anxiety and chi-squared tests were conducted to see if samples differed in terms of gender and race. Children who participated in both waves of data collection ( $N = 79$ ) did not differ significantly from children with only baseline data ( $N = 53$ ) on any of the examined variables ( $p > .05$  for all variables). Eight children were found to have staff only data, with the majority of children ( $N = 124$ ) possessing data in at least one wave of data collection. Therefore, there was not enough power to draw comparisons between these two groups.

## **Results**

### **Descriptive Statistics**

Correlations, means, standard deviations, skewness, and kurtosis of observed study variables prior to imputation are reported in Table 1. Because all 132 cases had data for measures of reactive and proactive aggression and demographics, correlations among these variables were not influenced by imputation. In line with findings from previous research, reactive and proactive aggression were highly correlated (Fite et al., 2012; Poulin & Boivin, 2000), sharing approximately 56% of their variance. Effects for gender were also observed in the unimputed data, whereby boys exhibited higher levels of reactive aggression than girls ( $r = .17, p < .05$ ).

Due to the fact that correlation coefficients are highly influenced by sample size, observed  $r$ -values among imputed variables did change. Child anxiety was not significantly related to age in the data prior to imputation ( $r = -.17, p > .05$ ). However, after data were

imputed, a significant relation emerged ( $r = -.18, p < .05$ ), indicating that older children had less anxiety than younger children. Prior to imputation, gender was negatively related to friendship quality, in that girls reported lower friendship quality ( $r = -.22, p = .05$ ).

Table 1

*Correlations, Means, Standard Deviations, Skewness, and Kurtosis for all Observed Variables*

	1	2	3	4	5	6	7	8	9
1. Gender	--	.03	-.14	-.02	.17*	-.02	-.06	-.16	-.34**
2. Age	.03	--	-.15	.11	.08	.12	-.18*	.16	.50**
3. Race	-.14	-.15	--	-.08	-.03	.03	.12	-.09	-.13
4. T1 Friendship Quality	-.03	.12	-.12	--	-.13	-.13	-.04	.04	-.08
5. T1 Reactive Aggression	.17*	.08	-.03	-.15	--	.75**	-.03	-.11	.02
6. T1 Proactive Aggression	-.02	.12	.03	-.12	.75**	--	.05	-.06	-.08
7. T1 Child Anxiety	-.04	-.17	.11	-.03	.03	.06	--	-.04	-.70**
8. T2 Friendship Quality	-.22†	.09	-.10	-.05	-.09	-.01	.09	--	.15
9. Friendship Stability	-.15	.21	.05	-.07	-.01	.01	-.28*	.10	--
M	--	8.83	--	3.79	1.56	1.28	1.52	3.99	.29
SD	--	2.43	--	.77	.84	.59	.54	.73	.46
Skewness	.--	--	--	-.54	1.57	2.96	1.12	-.76	.94
Kurtosis	--	--	--	-.12	.209	10.96	.71	.19	-1.16

Note. \*  $p < .05$ , \*\*  $p < .01$ , †  $p = .05$

Correlation values for data prior to imputation are reported to the left of the midline (Sample sizes range from 66 to 132)

Correlation values for imputed data are reported to the right of the midline.

Means, standard deviations, skewness, and kurtosis are reported for data prior to imputation.

However, after data were imputed, this relation become nonsignificant ( $r = -.16, p > .05$ ).

Changes were especially pronounced for relations with the dichotomous outcome, friendship stability. Correlations among unimputed data showed child anxiety at the beginning of the summer to be significantly negatively correlated with friendship stability ( $r = -.28, p < .05$ ). This relation became stronger after data were imputed ( $r = -.70, p < .01$ ), indicating that children who had more anxiety at the beginning of the summer were less likely to maintain the same best friend over the course of the summer.

Additionally, neither gender nor age was found to be related to friendship stability before data were imputed. After data were imputed, gender was significantly negatively related to friendship stability ( $r = -.34, p < .01$ ), in that boys had lower friendship stability than girls. Age was also positively related to friendship stability ( $r = .50, p < .01$ ), demonstrating that older children were better able to maintain the same friend over the summer. No effects for race were observed among the variables included in the model.

### **Path Models**

An initial path model was run in which friendship quality and stability at two-month follow-up were regressed on gender, age, friendship quality, reactive aggression, proactive aggression, and anxiety as measured at the beginning of the summer. This preliminary model allowed for the examination of the unique first-order effects of aggressive functions and anxiety on the friendship variables. The model was fully saturated (i.e., 0 degrees of freedom), indicating that the model provided a perfect fit to the data. Therefore, model fit statistics are not reported. Contrary to hypotheses, neither reactive aggression nor proactive aggression was uniquely associated with friendship quality or stability.



Table 2a

*Main Effects of Reactive Aggression, Proactive Aggression, and Anxiety on Friendship Quality*

Variable	$\beta$	SE
Gender	-.23	.16
Age	.05	.04
T1 Friendship Quality	-.00	.16
T1 Reactive Aggression	-.09	.24
T1 Proactive Aggression	-.00	.30
T1 Child Anxiety	-.03	.22

Table 2b

*Main Effects of Reactive Aggression, Proactive Aggression, and Anxiety on Friendship Stability*

Variable	$\beta$	SE
Gender	1.06	.63
Age	-.22	.12
T1 Friendship Quality	.26	.33
T1 Reactive Aggression	-.37	.58
T1 Proactive Aggression	.67	.93
T1 Child Anxiety	1.38*	.68

Note. \* =  $p < .05$

Reference group for the model was children who had unstable friendships.

Child anxiety symptoms were not associated with friendship quality, but were positively associated with friendship instability ( $\beta = .63, p < .01$ ), suggesting that high levels of anxiety increased the likelihood of children changing their reported best friends over the course of the summer (see Tables 2a and 2b) <sup>1</sup>.

Table 3a

*Interaction Effects of Reactive/ Proactive Aggression and Anxiety on Friendship Quality*

Variable	$\beta$	SE
Gender	-.24	.15
Age	.05	.04
T1 Friendship Quality	.02	.15
T1 Reactive Aggression	-.10	.23
T1 Proactive Aggression	.05	.28
T1 Child Anxiety	-.04	.21
Reactive Aggression X Anxiety	-.20	.52
Proactive Aggression X Anxiety	-.23	.53

Table 3b

*Interaction Effects of Reactive/ Proactive Aggression and Anxiety on Friendship Stability*

Variable	$\beta$	SE
Gender	1.05	.67
Age	-.24	.13
T1 Friendship Quality	.45	.35
T1 Reactive Aggression	-.47	.66
T1 Proactive Aggression	1.11	1.07
T1 Child Anxiety	1.49*	.76
Reactive Aggression X Anxiety	-.46	1.30
Proactive Aggression X Anxiety	-2.21	1.64

Note. \* =  $p < .05$

Reference group for the model was children who had unstable friendships.

Interactions between the functions of aggression and child anxiety were then added to the model to test for moderation effects (i.e., reactive aggression X anxiety, proactive aggression X anxiety). The model was once again fully saturated; therefore no model fit statistics are reported. Contrary to hypotheses, interaction terms for reactive aggression and anxiety as well as proactive aggression and anxiety were not significantly associated with friendship quality or stability (See Tables 3a and 3b) <sup>1</sup>.

### **Post-hoc Analyses**

The imputed correlation matrix showed associations between age and child anxiety as well as age and friendship stability. Likewise, gender was significantly related to reactive aggression and friendship stability. For these reasons, age and gender were examined as moderators of proposed relations by adding two- way (i.e., age X reactive aggression, age X proactive aggression, age X anxiety, gender X reactive aggression, gender X proactive aggression, gender X anxiety) and three- way interactions (i.e., age X reactive aggression X anxiety, age X proactive aggression X anxiety; gender X reactive aggression X anxiety, gender X proactive aggression X anxiety) to the model. These three-way interaction terms were not found to be significant predictors of either friendship quality or stability ( $p's > .05$ ), suggesting that associations among model variables did not significantly differ based on gender or age.

### **Discussion**

The current study extended the literature on relations between reactive and proactive aggression and variables related to friendship success (friendship quality and stability) in multiple ways. First, prior studies have not examined how these different motivations behind aggressive behaviors are related to children's ability to maintain friendships over time. Second, the sample consisted primarily of African-American children from low SES backgrounds.

Additionally, a wide age range (5 to 14 years old) of both boys and girls is represented. Up to this point, relations between functions of aggression and friendship quality have only been examined in a population of 4<sup>th</sup> through 6<sup>th</sup> grade Caucasian boys from primary middle-class backgrounds (Poulin & Boivin, 1999). Finally, the current study is the first to investigate whether anxiety moderates relations between reactive and proactive aggression and the quality and stability of children's friendships. Although no first order effects were found between reactive and proactive aggression and either friendship success variable, path models did demonstrate that high levels of anxiety were associated with an increased likelihood of having an unstable friendship over the summer. However, anxiety was not found to moderate the relations between functions of aggression and friendship quality and stability. Further, post-hoc analyses did not find gender or age differences for proposed relations.

### **Functions of Aggression and Friendship Quality and Stability**

Reactive and proactive aggression were not found to be differentially related to either friendship quality or stability. Findings are inconsistent with the current body of literature, which points to reactive aggression, but not proactive aggression, acting as a unique predictor of peer difficulties (e.g., Boivin, Dodge, & Coie, 1995; Card & Little, 2006). However, such studies have been specific to peer group relationships, and have not focused on close, dyadic friendships. In fact, Poulin and Boivin (1999) were the first to investigate how reactive and proactive aggression may impact children's best friendships. These researchers found distinct relations between reactive and proactive aggression and friendship quality using two factor scores (a supportive dimension and a conflict dimension). Boys' reactively aggressive behaviors were related to friendships that were characterized by reduced conflict over time, but proactively aggressive behaviors were related to increased conflict over time. Perceived support and

friendship satisfaction did not distinguish reactive and proactive aggression. Therefore, conflict may be a key distinguishing factor when examining the impact of motivations behind aggressive acts, and the current study would not have captured this nuance by relying on an aggregate measure of friendship quality.

Additionally, Poulin and Boivin (1999) only examined changes in friendship quality when boys' friendships were both reciprocated (as measured by peer nominations) and stable over the school year (46 % of the original sample), which is methodologically consistent with previous longitudinal research on friendship quality (e.g., Glick & Rose, 2011; Parker & Asher, 1993). However, the current study did not determine whether friendships were reciprocal nor did it assess for changes in friendship quality across the summer in the same friendship dyads. Children who are capable of maintaining their friendships over time may have higher quality friendships. However, friendship stability in the current sample was low (29%), rendering limited power to assess whether the relations between friendship quality and aggressive functions were different for children with stable versus unstable friendships. Given that stable friendships have been the focus of previous research, it would be informative for future studies to examine stability as a moderator between reactive and proactive aggression and friendship quality.

Further, certain characteristics related to reactive aggression may pose a particular challenge to studying the friendships of children who are reactively aggressive. Poulin and Boivin (1999) found that when boys displayed reactively aggressive behaviors, they were less likely to be nominated as a best friend, and had fewer reciprocated friendships as a result. Although previous studies have revealed that children in reciprocated friendships tend to report higher levels of friendship quality (Bukowski, Hoza, & Boivin, 1994), there appear to be no studies which have examined friendship reciprocity as a link between functions of children's

aggressive behavior and friendship success outcomes. It may be important for future studies to consider friendship reciprocity as a potential moderating factor in the link between children's aggression (especially reactively aggressive behavior) and changes in friendship quality and stability.

### **Anxiety as a Moderator**

Contrary to hypothesized relations, levels of anxiety did not influence the associations between functions of aggression and friendship quality and stability. However, a main effect for anxiety was found, suggesting that children with higher anxiety at the beginning of the summer were less likely to have a stable best friendship over the course of the summer.

### **Developmental Considerations**

Although age was not found to be a moderator in the proposed model, the literature suggests that the developmental trajectory of friendship stability may be quite complex. Friendships tend to become more stable from early to middle childhood (Berndt & Hoyle, 1985). Early adolescence is characterized by an increase in friendship instability (Bowker, 2004), but friendship stability increases once again in late adolescence (Degirmencioglu, Urberg, Tolson, & Richard, 1998). Changes in friendship quality across developmental periods have not been as much of a focal point in the literature. Additionally, how children's problem behaviors are related to friendship quality as an outcome at different stages of development is not well understood. As in the case of friendship stability, friendship quality may wax and wane during different stages of development. For these reasons, it is important for future research to take a developmentally sensitive perspective by examining relations in early childhood, preadolescence, and adolescence.

## Limitations and Future Directions

*Measurement considerations.* The current study accounted for best friendships by simply asking children “who is your best friend?” This method of measuring best friendships may have led to higher levels of friendship instability than would be expected using peer nominations. Future studies may wish to compare methods for selecting children’s best friends (sociometric peer nominations versus allowing children to list their best friend).

Children are typically the preferred informants of their friendship quality (e.g., Buhrmester, 1990; Parker & Asher, 1993). However, children who exhibit high levels of reactive aggression may have biased perceptions of the quality of their friendship (Bagwell & Coie, 2004; Polman, de Castro, Koops, van Bortel, & Merk, 2007). Future research may wish to examine whether outside informants can be used to gain a more accurate measure of friendship quality with children who are reactively aggressive.

Friendship quality is a multifaceted dimension, and reactive aggression may be related to particular difficulty in certain aspects of friendship (e.g. conflict and betrayal) but not others (e.g. companionship and recreation). The internal consistencies of the original FQQ subscales ranged from  $\alpha = .73$  to  $\alpha = .90$ , however, the short version of the FQQ used in the current study had considerably lower reliability within the subscales ( $\alpha$ ’s = .60 to .77). Therefore, it may be more beneficial for subsequent studies to utilize the long version of the FQQ in order to examine how reactive aggression relates to different facets of friendship quality.

Furthermore, the FQQ was originally validated on samples of children in the 3<sup>rd</sup> through 6<sup>th</sup> grades (Parker & Asher, 1993). Factors contributing to high quality friendships may differ across development, with some dimensions being less relevant for younger children (e.g., talking to their best friend about feelings). It may be beneficial for future studies to measure the

friendship quality of younger children and adolescents using a more developmentally sensitive assessment tool.

The DSM-IV oriented Anxiety Problems Scale was developed by selecting items from the Internalizing Scale of the Youth Self Report (YSR; Achenbach & Rescorla, 2001). The YSR is composed of multiple subscales, with items ordered alphabetically (rather than by subscale). Only select subscales of the YSR were used in the present study and the items comprising the Anxiety Problems Scale were not administered in the same order in which they were validated. Additionally, the Anxiety Problems Scale assessed for levels of anxiety with items related to symptoms of generalized anxiety disorder and specific phobias, yet most research linking anxiety to poor peer relationships (Kingery et al., 2010) has focused on social anxiety. Social anxiety may have a stronger link to reactive aggression and variables related to friendship success, and should be examined as a moderator of these relations in subsequent studies.

Finally, Dodge and Coie's (1987) measure of proactive and reactive aggression tends to focus on overt aggressive behaviors and overtly aggressive behaviors are related to lower friendship stability (Ellis & Zarbatany, 2007). Additionally, Dodge and Coie's (1987) measure yields a very high correlation between reactive and proactive aggression. Other measures which disentangle forms from functions of aggression have found lower correlations between reactive and proactive aggression (Dodge et al., 2007; Polman et al., 2007), and could potentially be the focus of future studies.

*Missing data strategies.* The data collected at the end of the summer was characterized by a large percentage of missingness (about 40%) prior to imputation. Missing data may result in biased estimates of the parameters of interest (McKnight et al., 2007), as well as reduced strength to detect effects.



Multiple imputation was employed in order to account for missing data. However, the small number of cases in the current dataset, combined with the large percentage of missingness, does not lend itself to be the best candidate for multiple imputation procedures, which tend to be better suited for larger datasets (Enders, 2010). However, FIMLE was unable to be employed as a missing data analytic strategy. Replication of the current study's findings in other samples will be necessary before firm conclusions can be drawn about observed relations.

*Characteristics of the setting.* Conducting the current study in a community center over the summer, rather than in schools over the course of a school year, provided a unique opportunity for investigating proposed relations. It is possible that children's friendships look very different over the summer than during the school year. The current sample had, on average, relatively high levels of friendship quality, but low levels of friendship stability. The summer session enabled children to be exposed to different peers and allowed for the formation of new friendships, which may be considered high in quality because children were able to bond more readily as they spent a great deal of time around one another.

However, it is unclear whether two months was enough time to observe anxiety symptoms play a role as a moderator between aggressive functions and friendship quality and stability. It may be that children who are both aggressive and anxious do not significantly differ from children without these behavioral problems in regard to their friendship quality and stability in the short term. Future studies should examine relations over a longer period of time, such as over the course of a school year or even across multiple years.

*Characteristics of the sample.* The current study consisted primarily of African-American (73%) children from low socioeconomic backgrounds, whereas the literatures on child anxiety and friendships are largely composed of studies using Caucasian, middle-class children

and adolescents (Rubin et al., 1998). The unique features of the sample should be considered a strength of the current study, given that this population may be more likely to experience a host of environmental risk factors, such as exposure to family and community violence (Foster, Brooks- Gunn, & Martin, 2007). Consideration of these environmental risk factors should be integrated into models relating reactive and proactive aggression to friendship variables, especially in socioeconomically disadvantaged populations. However, results still may have limited generalizability to all youth, and future research of these relations may wish to include a more ethnically and socioeconomically balanced sample.

*Conclusion.* Although the current study did not yield support for the proposed models examining anxiety as a moderator of reactive and proactive aggression and friendship quality and stability, it did demonstrate that anxiety, even when less directly related to social experiences, can lead to problems with maintaining friendships over just a couple of months. The examination of proposed relations in a predominantly African-American, economically disadvantaged sample made an important and unique contribution to the literature given that “at-risk” minority youth are an especially important population to focus prevention and intervention efforts.

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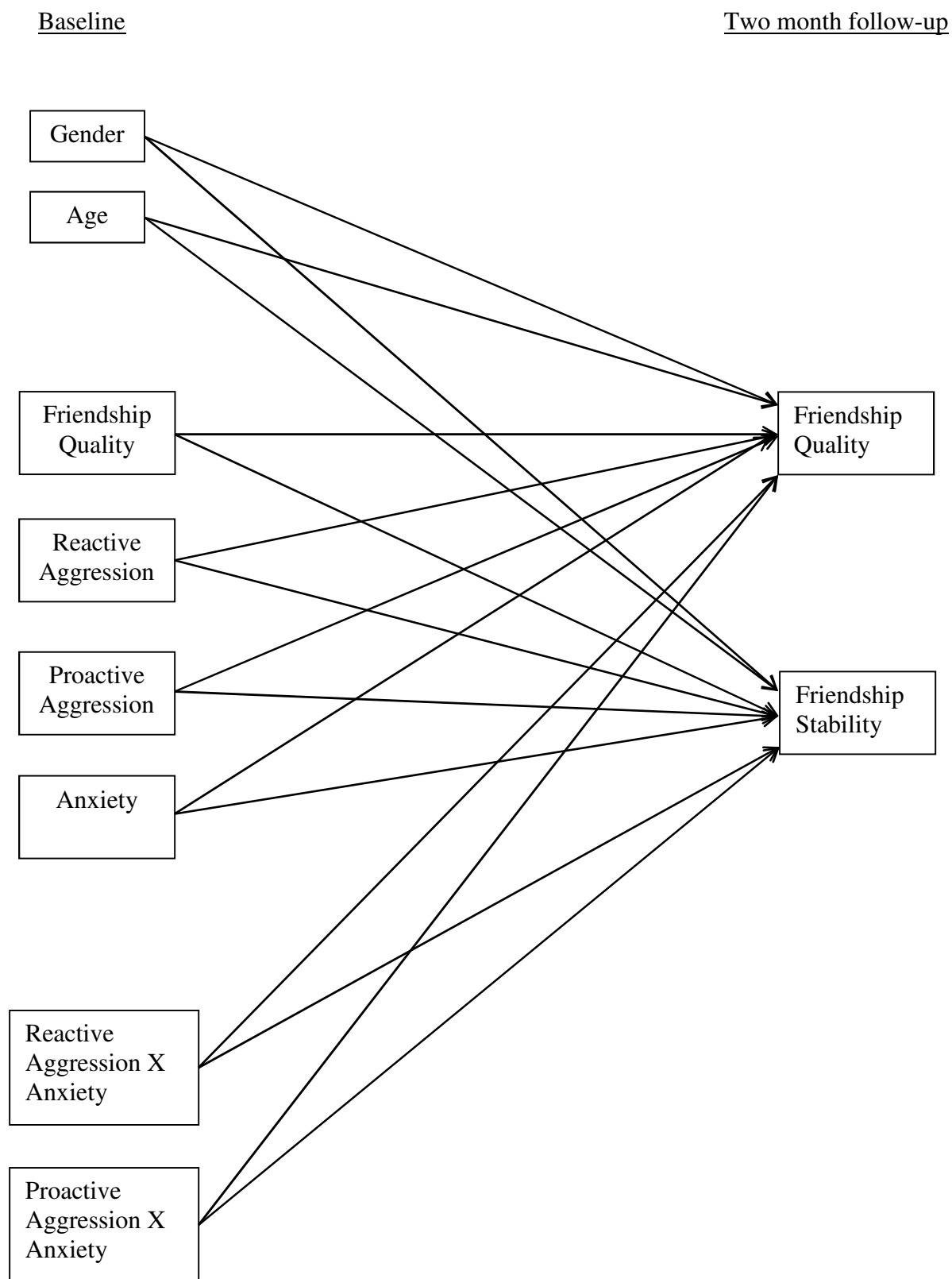
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## Footnote

<sup>1</sup> All regression analyses were performed using SAS 9.3 software both prior to imputation and after data were imputed. These results were compared to models estimated in MPlus with imputed data. Similar patterns of results were observed when models were run in SAS (both before and after imputation) and in MPlus. Of note, standard errors in the SAS regression models were larger prior to imputation than after imputation. However, parameter estimates, standard errors, and *p*-values in SAS and MPlus models using imputed data were essentially identical.

Figure 1.





## Appendix

**Proactive/ Reactive Aggression Questionnaire**

(Dodge &amp; Coie, 1987)

1	2	3	4	5
Never	Very Rarely	Sometimes	Often	Almost Always

1. When this child has been teased or threatened, he/she gets angrily easily and strikes back.
2. This child always claims that other children are to blame in a fight and feels that they started the trouble.
3. When someone accidentally hurts this child (such as bumping into him/her), he/she assumes the peer meant to do it and then reacts with anger/fighting.
4. This child gets other kids to gang up on somebody that he/she does not like.
5. This child uses physical force (or threatens to use physical force) in order to dominate other kids.
6. This child threatens or bullies others in order to get his/her own way.

**Youth Self Report: Anxiety Problems Scale**

(Achenbach &amp; Rescorla, 2001)

1	2	3
Not True	Somewhat or Sometimes True	Very or Often True

1. I am afraid of certain animals, situations, or places, other than school.
2. I am afraid of going to school.
3. I am nervous or tense.
4. I am too fearful or anxious.
5. I worry a lot.

**Friendship Quality Questionnaire**

(Parker and Asher, 1993)

1	2	3	4	5
Not at all True	A Little True	Somewhat True	Pretty True	Really True

1. My best friend makes me feel good about my ideas.
2. My best friend tells me I am good at things.
3. My best friend and I make each other feel important and special.
4. My best friend and I make up easily when we fight.
5. My best friend and I get over our arguments really quickly.
6. My best friend and I talk about how to get over being mad at each other.
7. My best friend and I argue a lot.
8. My best friend and I fight a lot.
9. My best friend and I get mad a lot.
10. My best friend helps me so I can get done quicker.
11. My best friend and I help each other with schoolwork a lot.
12. My best friend gives advice with figuring things out.
13. My best friend and I always sit together at lunch.
14. My best friend and I always pick each other as partners for things.
15. My best friend and I always play together at recess.
16. My best friend and I always tell each other our problems.
17. My best friend and I talk about things that make us mad.
18. I talk to my best friend when I am mad about something that happened to me.